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Evaluation and Treatment of Temporomandibular Joint Disorder: A Case Report

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EVALUATION AND TREATMENT OF TEMPOROMANDIBULAR JOINT DISORDER: A CASE REPORT

by

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This Scholarly Project, submitted by Melanie Fuller in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.

Graduate School Advisor

Chairperson, Physical Therapy

PERMISSION

Title	Evaluation and Treatment of Temporomandibular Joint Disorder: A Case Report
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ABSTRACT

Background and Purpose: Temporomandibular joint disorder (TMD) affects 40 to 60% of the US population and is primarily prevalent in 35 to 45 year old females. It involves a multitude of anatomical structures including bilateral temporomandibular joint (TMJ) and numerous muscles affecting the TMJ. Examination and treatment of TMD generally requires a whole person approach due to the complexity of involved structures. The purpose of this case study was to educate physical therapists in TMD and provide intervention options.

Case Description: The patient was a 36-year-old female referred to physical therapy by her oral surgeon. She presented with bilateral jaw pain, intermittent headaches in the occipital region, crepitus and hypermobility in her TMJ and postural dysfunction.

Intervention: PT treatment included patient education on posture, iontophoresis for inflammation and pain reduction, manual therapy, strengthening and stretching of a variety of jaw, back and chest musculature as well as a home exercise program.

Outcomes: Response to the iontophoresis treatment was perceived well, which allowed the patient to learn and complete strengthening and stretching exercises without increased pain or inflammation. She was able to open her mouth within functional limits without pain or crepitus as well as no deviation, which was a significant improvement.

Discussion: Physical therapists should take a holistic approach and consider not only treatment for the TMJ, but also review posture and other potential impacts causing the patient's symptoms. The patient in this case study had great outcomes with the approach taken by physical therapy and was able to avoid surgery.

CHAPTER I

Background and Purpose

The temporomandibular joint (TMJ) is a fibrocartilaginous hinged type joint which sits between the mandible and the temporal bone of the skull.[1] The main actions of the TMJ are gliding, sliding and translation, which all occur during everyday actions such as talking, yawning, and eating. The upper ends of the mandible, called condyles, glide along the joint socket during mouth opening and closing. The condyles are separated from the joint socket by a soft tissue disc which serves as a shock absorber during movements, such as chewing.[2] A multitude of muscles, including the sternocleidomastoid, omohyoid and suprahyoid, attach to bones in the cervical spine, shoulder, and jaw, and have interrelated effects on all three areas.

A common reason for TMJ disorders is pain in the TMJ or in the muscles that aid with TMJ movement. TMJ disorder is a type of temporomandibular disorder (TMD).[3] TMD is classified as a subgroup of orofacial pain disorders and has two types, which are muscle pain and pain generated by the jaw joint.[4] TMD is diagnosed when a multitude of symptoms are present including tooth clenching, diseases of the jaw (for example arthritis), head and neck muscle tension and emotional stress. TMJ inflammation and myofascial pain are sub-diagnoses of TMD.[5] Myofascial pain occurs when a muscle is contracted repetitively which can be caused by repetitive motions or stress related muscle tension.[6] The prevalence of TMD ranges from 40 to 60% in the US population with some studies indicating numbers as high as 87% of the population being affected.[7]

Kraus et al[8] found the main symptoms patients with TMD demonstrated were pain, popping or locking with jaw opening and limited jaw range of motion (ROM). In addition, many patients (69% of the 511 patients in the study) reported neck pain and of these patients, 74% reported that they experienced headaches along with the neck pain. The study also found that females were more commonly affected by TMD than men and the primary age group was 35 to 45 years old. Female patients with TMD showed a higher severity of symptoms compared to male patients, although the pain rating showed no significant distinction between genders. The majority of the patients in the study were referred to physical therapy by their dentist and the second most common referral source was by an oral surgeon. The article indicated that dentists should involve physical therapists as soon as possible in the care of patients with TMD. All health care professionals, including dentists and physical therapists, should work together. TMD treatment requires specialized training of the health care professional; however this specialization is not widely available. The authors concluded that due to the multifactorial issues with TMD, patients need more treatment options than over the counter medication and appliances, which trained physical therapists can offer.

Physical therapy can be very beneficial in treating TMD by utilizing a whole person approach. Karibe et al[9] published an article reviewing treatment outcomes of patients with TMD by age group. The article stated that in order to accurately diagnose TMD, a full clinical examination must be performed. Examination should include the muscles of mastication, cervical musculature, ROM measurements of the TMJ and the cervical spine, TMJ noise, an intraoral exam, as well as a review of the cranial nerves. Physical therapy treatment options can include a home exercise program (HEP), TMJ

and/or cervical spine mobilization, postural training, and therapeutic agents such as ultrasound and vapocoolant spray. Authors found that patients with myofascial pain had no significant differences between age groups aside from older patients having greater difficulty with sleeping. The authors suggested that clinicians should take age and related symptoms into consideration when developing intervention strategies including postural training and therapeutic agents. In general, surgery was rarely recommended to treat TMD. Occlusal orthotic or splints may be provided if the patient was treated by a dentist.[5]

Ucar et al[10] reviewed the effectiveness of using ultrasound as a modality along with home exercises for patients with TMD versus using a HEP alone. The patients were evaluated using the visual analog scale (VAS) and were assigned pain free maximum mouth opening scores. The HEP consisted of slow, controlled mouth opening and closing exercises, isometrics and stretching exercises, as well as patient education to control pain with lifestyle changes and ergonomic adjustments. The patients performed the HEP exercises twice a day for 4 weeks. Ultrasound was administered to half the patients to the TMJ region five times a week for 4 weeks, along with the HEP exercises. The values of the visual analogue scale as well as the pain free maximum mouth opening scores improved for the subjects in both groups after the treatment, with a more significant improvement in the group that completed both the HEP exercises and received ultrasound. These findings support the appropriate use of an anti-inflammatory modality along with exercises to treat TMD.

Current research shows that treating a patient with TMD requires health care professionals to work together as a team. The importance of a whole person approach

during physical therapy is essential for successfully treating the patient. There are a variety of options for treatment interventions available for TMD and given that prescribed physical therapy sessions are generally more limited, the effectiveness of the intervention is critical.

The purpose of this case study is to educate physical therapists on TMD and to provide a multitude of intervention options that have been proven as successful.

CHAPTER II

Case Description

The patient was a 36-year-old English speaking Caucasian female referred to physical therapy by her oral surgeon with a diagnosis of bilateral (B) TMD. She presented with bilateral jaw pain, intermittent headaches in the occipital region, and postural dysfunction. The patient stated that she had pain in the bilateral jaw since approximately 2012 and the location of her pain was at the masseter and pterygoid musculature and pain in the TMJ B.

The patient reported that the pain at B TMJ was constant and rated her pain a 2 at rest on the VAS (with 0 being no pain and 10 being the maximum) and a 6 out of 10 at its highest point with chewing. She described her pain as aching and dull and experienced relief with an anti-inflammatory medication, muscle relaxers, and with positional changes. The positional changes included standing breaks while at work as well as leaning back in her chair at her desk throughout the day.

The patient reported she was able to complete all of her activities of daily living (ADLs) including working while sitting, various household chores, lifting items, independent self-care and social activities. She experienced increased pain in her jaw along with intermittent headaches during these activities. She stated that she had to be careful with what food she ate (chewy textures) and the size of bites she took. Also, she needed to be aware of how far to open her mouth when she had to yawn as too much opening caused her jaw to lock. The food type, bite size and jaw opening all affected her pain levels and emerging symptoms.

She was married and had two children. The patient reported that she enjoyed spending time with her family and that she led an active lifestyle playing with her children. She reported she worked at a desk job which placed her consistently into a forward head posture. The patient's past medical history included adenoid removal and stomach ulcers at the age of 10 years old but no other diseases or injuries were reported. She stated that she had not sought treatment prior to going to her oral surgeon. Relevant medications that the patient was taking were birth control, meloxicam and a muscle relaxant. She was a non-smoker with no possibility of pregnancy. The patient's chief complaint included decreased function, headaches and increased pain in her jaw.

Examination, Evaluation and Diagnosis

Cardiovascular, pulmonary, and neuromuscular system reviews were not assessed with the patient. The patient's skin integrity was intact and nothing out of the ordinary was observed. The patient demonstrated rounded shoulders and a forward head posture during sitting and standing. She was ambulatory without an assistive device and was oriented x4 to person, place, time and situation. The examination entailed a complete review of the TMJ including ROM, strength, as well as a review of the patient's posture in various settings. Many of the postural muscles attach to regions on the skull or jaw, which affect the TMJ.

A TMD history and examination form was used to gather information from the patient during the initial evaluation. The content of the form was originated by Steve Kraus and was used as the examination and evaluation tool at the outpatient clinic. Gonzalez[11] completed research and found that the questionnaire regarding TMD developed by Kraus seemed to produce reliable and valid results. The research was

conducted with 504 participants and entailed short and long versions of the questionnaire. The questions were very similar in comparison to the questionnaire that was used with this case. The outcomes showed high results with reliability, sensitivity and specificity, which are indicative of the validity and usefulness of this questionnaire (see Appendix A).

The patient was first asked to disclose her primary symptoms and frequency of those symptoms. Then the patient was examined via ROM measurements including the cervical and mandibular regions, tissue palpation and movements ranging from mandibular dynamics to post attachment review (inside the ear). The patient's gross ROM for cervical flexion and extension, right (R) and left (L) rotation and side bending were all within functional limits (WFL). Her lateral deviation and protrusion of the jaw were also found to be WFL. Her maximum mandibular opening with midrange lateral deviation to left and pain was 47mm and without pain was 40mm (see Table 1).

Table 1: Range of TMJ Motion Measurements

Range of Motion	***Left***	***Right***
Cervical Extension	WFL	
Cervical Flexion	WFL	
Cervical Rotation to R & L	WFL	
Cervical Side Bending to R & L	WFL	
TMJ Lateral Deviation to R & L	WFL	
Mandibular max opening with midrange lateral deviation to the L and pain	47mm	
Mandibular max opening with midrange lateral deviation to the L and no pain	40mm	

The patient demonstrated opening clicks bilaterally but stated they were not painful. She did not experience tenderness to palpation to the posterior attachments of the TMJ bilaterally, including palpation of the mandibular fossa and the condyles. She did demonstrate tenderness bilaterally to the masseter, lateral pterygoid and temporalis musculature with greater discomfort on the right compared to the left side. The patient indicated no pain with joint loading bilaterally (biting on a fulcrum between molars on each side).[12]

The evaluation and examination results indicated that the patient had a forward head posture with rounding of shoulders. She had shortened sub-occipital as well as shorted pec minor musculature, caused by her posture while standing and sitting. Her maximum mandibular opening was determined to be hypermobile at the R and L TMJ. Her signs and symptoms were consistent with a diagnosis of myofascial pain with disc displacement and hypermobile TMJ ROM during opening.

The patient's most prominent impairments were reduced quality of life and function due to increased jaw pain and headaches. She also experienced limitations in the variety of her food intake, based on size and substance (chewy versus soft foods).

After completion of the physical therapy evaluation, the patient was diagnosed with TMD along with postural deficits. ICD-9 codes and descriptions are listed below in Table 2.

Table 2: Medical Diagnosis with ICD-9 codes[13]

ICD-9 code	***Description***
524.62	Temporomandibular joint disorders, arthralgia of temporomandibular joint
784.0	Headache
G44.1	Vascular headache, not elsewhere classified
M26.62	Arthralgia of temporomandibular joint

The anticipated goals were developed and the patient was in agreement with the goals.

Short term Goals (two weeks):

1. The patient will be consistent with performing her HEP and attending and participating in physical therapy sessions.
2. Following PT intervention, the patient will be able to demonstrate improved posture with decreased forward head and rounding of shoulders in order to enhance jaw alignment and reduce inflammation of musculature.
3. Following PT intervention, the patient will be able to perform her mouth opening exercise daily within functional limits for ROM without pain or popping sounds in order to control her opening while talking and eating.

Long term Goals (four weeks):

1. Following PT intervention, the patient will be able to follow the oral activity restrictions on a daily basis in order to avoid inflammation of the TMJ and ensure she can eat her meals with 0/10 pain.

2. Following PT intervention, the patient will be able to limit over-opening her jaw while talking or eating in order to reduce pain consistently to a 0/10 and improve her jaws resting posture at work.
3. Following PT intervention, the patient will be able to open her jaw without deviation and no crepitus or clicking noise while talking, eating, or yawning in order to improve her jaws resting posture and refrain from causing pain or inflammation.

Prognosis and Plan of Care

The patient's prognosis was good with goals of reduction in jaw pain and inflammation as well as improved controlled movements of the TMJ. In addition, the headaches were anticipated to lessen in frequency due to muscle re-education and strengthening to hold corrected posture at work and at home. She was expected to return to completing all ADLs pain free as well as eating a larger variety of foods, because she would be able to open her mouth further and pain free.

The plan of care was scheduled once a week for five weeks for physical therapy treatment. The course of physical therapy treatment would consist of iontophoresis to B TMJ for pain control and reduction of inflammation, soft tissue mobilization to the pterygoid, masseter and temporalis muscle, postural interventions, and strengthening of postural musculature. The postural muscle strengthening functioned to assist in decreasing her forward head posture and rounding of the shoulders, which would promote an improved resting position of her jaw. The patient would also receive a personalized HEP. By being compliant with the HEP, this would help to keep the signs and symptoms of TMD reduced or eliminated long term.

CHAPTER III

Interventions

A whole person approach was required for PT treatment to address the interrelated issues of poor posture, TMJ pain and crepitus. The whole person approach took the patient's schedule, life style, and her current medical condition into consideration to establish the number of physical therapy treatments and create her home exercise program.

PT intervention started with educating the patient on correct posture while she was at work, at home, and sleeping. Postural education included work place ergonomics ranging from computer height, distance of computer screen to the chair, arm rest height of work chair and sitting upright with her head in a neutral position and shoulders retracted. In addition, the patient was educated on posture utilizing her posterior cervical and thoracic spine musculature to stand erect. Sleeping suggestions entailed having the patient sleep on her back or to use pillows to hug and place between the legs when side-sleeping. Both postural positions are crucial in treating TMD due to the overlapping effects of the musculature (such as sternocleidomastoid, omohyoid and suprahyoid) on posture and TMJ joints.

PT interventions also addressed her acute pain with administration of iontophoresis of 2.0 ml of Dexamethasone to the masseter musculature bilaterally during every PT session. Following iontophoresis intra-oral soft tissue mobilization of the pterygoid muscle, external soft tissue mobilization of the masseter and temporalis muscles along with suboccipital musculature release was performed bilaterally (B). The

soft tissue mobilization was administered for 12-14 minutes with a moderate level of cross friction massage and trigger point release. A suboccipital muscle release was held between 15 seconds to one minute for two to three repetitions.

Stretches for the following muscles were performed B: levator scapulae, scalenes, upper trapezius, and pectoralis minor and major. All stretches were held for 30 seconds and performed twice a day with two repetitions each time. The levator scapulae, scalenes and upper trapezius stretches were performed B in a seated position with controlled upright posture. The pectoralis minor and major stretches were completed by standing in a doorway as well as in a corner of a room.

Strengthening exercises were performed for 2 sets of 10 repetitions, also twice a day. The controlled jaw opening/closing exercise was completed in front of a mirror with her tongue at the roof of her mouth and the patient actively controlling her lateral deviation to the left side. Chin tucks and deep neck flexor strengthening were performed in supine in a hook-lying position. Scapular adduction was completed in standing with a red theraband for resistance. The jaw musculature isometric strengthening exercises were performed in a seated position on the left side of her face and the patient used her hand for resistance.

The patient was given a home exercise program that included the same activities done in PT. Explanations of all the exercises, pictures, and how often they were to be completed along with a red theraband were given for home usage (see Table 3). The patient's HEP included stretches to the following musculature: levator scapula, scalenes, upper trapezium and pectoralis major and minor. In addition, it included strengthening exercises such as controlled jaw opening and closing in front of a mirror, chin tucks and

deep neck flexors strengthening in supine, scapular adduction in standing with a red theraband and jaw muscle isometrics. The stretches were to be performed twice a day and held for 30 seconds and the strengthening exercises were to be completed twice a day with two sets of 10 repetitions.

An oral activity restriction HEP was given at the first visit, which included guidelines for eating, jaw and neck postures and when to apply heat or cold for pain management (see Appendix A). The jaw resting posture guidelines included keeping her teeth apart during the day with lips together unless the patient was eating or talking. The foundation for her HEP was to instill good posture and proper mouth opening for long term pain relief.

Table 3: PT Interventions and HEP

Stretches *(30 second holds 2x per day for each)*	***Strengthening*** *(2 sets of 10 repetitions 2x per day)*	***Manual Therapy*** *(12-14 minutes moderate level)*
Levator Scapulae	Controlled jaw opening/closing	Intra-oral soft tissue mobilization: Pterygoid
Scalenes	Chin tucks	External soft tissue mobilization: Masseter and Temporalis
Upper Trapezium	Deep neck flexors	Suboccipital musculature release (15 seconds to 1 minute 2-3 times)
Pectoralis Major and Minor	Scapular adduction (with red theraband)	
	Jaw musculature isometrics	

Calixtre et al[14] completed a systematic review on utilizing manual therapy as an intervention for patients with TMD. The effectiveness of manual therapy was investigated in relation to pain control and mouth opening ability with patients with TMD. The authors listed some general interventions that had been proven to work on patients with TMD, ranging from behavioral therapy to postural and jaw opening exercises, pharmaceuticals, acupuncture and occlusal appliances. In this study, manual therapy was applied directly to the TMJ, the muscles of mastication, the cervical spine and neck musculature. Generally, manual therapy aided with decreasing muscles spasms as it relaxed musculature, aided in realignment of soft tissue, helped with pain control and increased ROM in TMJ and the cervical spine. The authors listed various studies, all of which included manual therapy techniques to treat patients with TMD. The results demonstrated that manual therapy had a positive effect on pain reduction in patients with TMD compared to patients who did not receive manual therapy. The authors pointed out that further research was needed in order to replicate the outcome of the reviewed studies with more detailed documentation.

Wieckiewicz et al[15] completed a review of research that discussed clinical relevance and practical validity of applications to help manage and treat TMD. Articles were excluded if they did not have an outstanding practical aspect and evidence-based background. The most commonly reported conservative treatments included massage therapy, occlusal splints, and manual therapy. In addition, taping, warming/cooling of aching joints, light and laser therapy and exercises and counseling were also identified as interventions. The most important aspects of a conservative treatment protocol was identified to be patient education. Medication was utilized by many patients and surgical

restoration of the TMJ was used for the most severe TMD cases. The authors concluded that conservative treatment should be considered first, due to the low risk of side effects. To treat patients with severe acute pain or chronic pain, research suggested utilizing pharmacotherapy for inflammation and/or degeneration as well as minimally invasive procedures (such as muscular training and Transcutaneous Electrical Nerve Stimulation) and/or invasive procedures (for example surgical procedures to drain the TMJ joint and reduce inflammation).

The patient was discharged after her fifth PT visit and was instructed to continue her HEP and follow the oral activity restriction guidelines. The patient had decreased pain, improved posture and improved jaw ROM upon discharge.

CHAPTER IV

Outcomes

The patient was seen for PT intervention for five total visits (one time a week) over a five week period. The patient's outcomes were as anticipated and the patient met the established short term and long term goals, which addressed TMD and posture. Response to the iontophoresis treatment was perceived well with no skin irritation, which allowed the patient to learn and complete strengthening and stretching exercises without increased pain or inflammation. She was able to open her mouth within functional limits without pain or popping sounds as well as no deviation. Her initial ROM for maximum mouth opening with pain was 47 mm and 40 mm without pain but including lateral deviation to the left. Following physical therapy treatment, her mouth opening without lateral deviation to the left was achieved to approximately 35 mm without pain. This allowed her to resume activities such as going out to eat and yawning with controlled mouth opening as well as keep a proper jaw resting posture. According to a study by Walker, the average mouth opening range of motion for people who do not have TMD is roughly 43 mm[16]. The average mouth opening range of motion for people with TMD was reported around 36 mm. Per these findings, the patient was within the average mouth opening ROM for people with TMD.

The patient was able to recall and follow the oral activity restrictions correctly (see Appendix A). This reduced the risk of future inflammation of the TMJ, as well as pain reduction to 0/10 in the TMJ and surrounding musculature. She reported she was

completing her HEP strengthening and stretching exercises twice a day during the week. Patient also stated she was following the workplace ergonomics provided to her. She demonstrated improved posture during sitting, standing, and reported she was following the sleeping guidelines with the use of a pillow on a daily basis. Patient stated a reduction in headaches which was accomplished by muscle re-education and strengthening to maintain her improved posture. No compliance issues were found with the patient and her risk of redeveloping TMJ issues were minimized and managed as she attended physical therapy sessions as scheduled, was able to recall her HEP and performed all exercises correctly. The patient was advised by the oral surgeon that if physical therapy treatment was unsuccessful, she would undergo oral surgery. The patient's compliance of completing her treatment sessions and HEP was supported by her motivation to avoid surgery.

No formal patient satisfaction survey was administered after discharge from PT; however the patient did not voice any concerns and appeared satisfied with her outcomes. An outcome measurement tool that was not used in this case but would seem appropriate is the TMJ Disability Index[17]. The questionnaire has two versions, one short and one long. The short version has four sections with multiple sub-questions where the patient rates his or her level of difficulty with each of the activities listed. The questions primarily pertain to the patient's ability to eat and carry out a conversation. The higher the score on the questionnaire, the greater the disability was indicated. The long version has ten sections and includes categories such as dizziness, sleep, sexual function, communication and normal living activities.

CHAPTER V

Discussion

The patient's signs and symptoms appeared to be a combination of head and upper body issues, which affected each other and needed to be treated holistically. She was a good candidate for the iontophoresis treatment, since she had inflammation in her TMJ bilaterally that needed to be attended to. A research study found that the use of dexamethasone iontophoresis with patients who had TMJ involvement as well as juvenile idiopathic arthritis was effective and safe for initial treatment of the TMJ[18]. The authors point out that further research is needed.

A holistic approach, along with physical therapy treatment, becomes evident when looking back at this case and literature relating to TMD. The positive outcomes of pain reduction highlight the importance of physical therapy in treating TMD. Physical therapy offers an alternative to surgical intervention with its many noninvasive treatment options. In addition, physical therapists take a holistic approach and consider not only treatment for the TMJ but also review posture and other potential impacts causing the patient's symptoms. Physical therapy treatment administered in this case study included the majority of interventions found in current literature. Treatments entailed a personalized HEP, joint and soft tissue mobilization, postural training and the use of therapeutic agents. The results included improved jaw ROM, decreased pain ratings, and reduced jaw locking and crepitus. All of these improvements related to findings from the literature review for other patients with the same diagnosis.

The history and examination questionnaire developed by Kraus and used in this case was also found to produce valid and reliable results in current literature. The questionnaire seemed appropriate for this patient and gathered the most pertinent information necessary to develop a successful treatment plan. It guided the physical therapist to include mouth opening deviation and ROM activities, as well as resting posture of the TMJ and overall postural exercises for the patient while seated, standing and sleeping in the treatment plan. The therapist gathered information on pain rating and included myofascial release techniques and iontophoresis for inflammation reduction and to decrease TMJ pain.

Future research may incorporate a thorough analysis of causes for TMD and prevention methods. One aspect that lacked clarity was the degree of impact of postural versus TMJ structural deficiencies and the likelihood of developing TMD. Another question that would benefit from further research is how much impact life style, food choices and genetic history have on the development of TMD. The literature review supported the treatment options utilized for the patient in this case study but did not reveal extensive information regarding prevention. Further research is also needed regarding the validity and reliability of measurement tools to diagnose and treat TMD. It was difficult to find solid studies that had data on validity and reliability for TMD examination and diagnosis. Future research may also incorporate the use of imaging and its' benefits related to accurate diagnosis, as well as choices for effective treatments based on the imaging findings.

Limitations of this case report lie in the lack of long term follow up between the physical therapy office and the patient. The patient completed her five scheduled

sessions and appeared to be doing well at discharge but it is unclear how well the patient has done long term. The patient truly needs to adhere to a long term commitment to follow the oral activity restriction as well as her HEP on a daily basis in order to avoid a flare up of her TMD. It would be interesting to see how she is doing now, several months post completion of her treatment and if she had any reoccurrence of her symptoms. A satisfaction survey would be helpful to identify how the patient perceived the treatment she received and may give rise to more information on long term HEP compliance.

Reflection

The PT plan of care seemed appropriate for the patient and her condition. Possible alterations could have been moving the 5th appointment out for two weeks instead of one week or adding a sixth appointment. Utilization of ultrasound in place of iontophoresis could have been another possible alteration. It would have been interesting to see how the patient was doing after a longer duration of not receiving physical therapy. This would have also provided a more accurate picture of her recall of the HEP and how diligent the patient was in completing the exercise and posture activities. The order of PT treatment addressed the inflammation first and then incorporated the strengthening and stretching exercises. The patient's HEP worked well with great compliance by the patient. Overall, the PT treatments that were administered as well as the order of PT interventions all seemed appropriate and successful for the patient.

A tool that was found in the literature review but not used with this patient was the TMJ Disability Index questionnaire. The TMJ Disability Index questionnaire would be helpful in determining prior and post treatment level of function. It focuses more on functional movements and asks the patient to rate their ability to communicate

and eat. The questionnaire used with this case focused more on TMJ symptoms such as ROM, crepitus, muscle soreness, pain and oral appliances. The TMJ Disability Index could have been useful in gaining more insight into the patient's quality of life and what aspects were affected and to what degree. Both questionnaires should be used for patients with TMD in the future to ensure a whole person approach.

Future research questions of interest may incorporate impact of structure versus posture relating to TMD. Can a person have TMD strictly due to TMJ structural issues while maintaining a good posture? Can poor posture lead to TMD without having signs such as hyper-mobility or hypo-mobility or crepitus in the TMJ?

One follow up that would have been of interest is the referring oral surgeon. The oral surgeon stated to the patient that she could try physical therapy but if deemed unsuccessful, she would need to have surgery. The patient was thus highly motivated to come to physical therapy and complete the PT sessions. It would have been interesting to see if the oral surgeon would consider the patient as successfully treated after re-examination or if there would be any other follow ups that he would recommend.

I was able to work with several patients that were diagnosed with TMJ issues over the course of my clinical rotation at the private outpatient clinic. I am grateful for this opportunity and have established a comfort level in treating patients who experience TMD signs and symptoms. More entry level education for PT's would be beneficial to address TMD and the many PT interventions that can be used to treat a patient holistically and successfully.

APPENDIX A

HOME CARE FOR JAW AND NECK RELATED SYMPTOMS

Your role in the management of your jaw and neck related symptoms is of great importance. The following measures are aimed at minimizing stress on your temporomandibular joints, jaw and neck muscles. Many painful conditions of the temporomandibular joints, jaw and neck muscles tend to be aggravated by certain behaviors you do during the day and night. The goal of all the following measures is to avoid pain, and this should be your main guide as to how strict you need to be in complying with each recommendation.

1. **Eating**

   Avoid foods that are uncomfortable for you to chew. Eat food that you enjoy as much as possible. You goal is to avoid or minimize pain while eating, or lingering ache after eating.

   a) Cut all foods into small, bite-sized pieces and try to avoid hurried meals.
   b) Do not eat hard crusts of bread, tough meat, raw vegetables, or any other food that will require prolonged chewing
   c) Completely eliminating chewing gum, ice, biting finger nails, chewing the inside of your cheeks, etc.

2. Jaw posture

   Keep your teeth apart with lips together except when eating and swallowing. Many people unconsciously keep their teeth together, referred to as clenching or bruxism. This is a major habit to break, because it is usually done when the mind is focused on something or is stressed, such as driving, computer work, or experiencing other occupational, family, or academic stressors.

   a) Avoid wide opening, as in singing or routine dental care. When yawning, limit mouth opening by placing your tongue against the top of your mouth.
   b) Avoid leaning or pressing on your jaw while working at the computer, watching TV, etc.
   c) Avoid excessive talking. Avoid holding the telephone receiver between your head and shoulder.
   d) Avoid deliberately popping your jaw.

3. **Neck posture**

   a) Do not sit slumped at your desk or at home. Avoid sitting on a soft couch/chair and do not fall asleep on couch or chair.
   b) Do not sleep on your stomach. Best to sleep on your back. If side sleeping, do not place hands by your face.
   c) When exercising with free weights or gym equipment, do so with good head/neck posture and with lips together and teeth apart.

4. Heat/Cold

Apply head (dry or moist) 2 to 3 times a day over the large chewing muscles below and in front of your ears. Heat can also be applied to your neck. Heat should be hot, but be careful to avoid scalding. During or after the heat application, gently massage the muscles by moving the skin over them—do not press hard on the muscles. If the heat is effective, cold may be applied using gel packs cooled in the freezer, or ice in a plastic bag. Place a thin towel between your skin and ice.

Should you have any questions before your next appointment please call (605)334-5630.

Courtesy of Steve Kraus, PT, OCS, MTC, CCTT

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